AMENDMENTS TO THE CLAIMS

1. (original) An apparatus for manipulating the temperature of a sample used in focused ion beam FIB processing, comprising:

a base member;

a thermoelectric module disposed over the base member; and

a sample mounted on a mounting surface of the thermoelectric module;

wherein said thermoelectric module is configured so as to reduce the temperature of said sample with respect to an ambient FIB tool temperature.

2. (original) The apparatus of claim 1, wherein said thermoelectric module further comprises a Peltier device.

3. (original) The apparatus of claim 2, wherein said thermoelectric module is configured to draw heat from the sample and exhaust said heat through said base member.

4. (original) The apparatus of claim 1, wherein said thermoelectric module is electrically coupled to a current source through an electrical connector disposed through a vacuum chamber wall of an FIB tool.

5. (original) The apparatus of claim 1, further comprising a thermal ballast module mounted on said base member.

6. (original) The apparatus of claim 5, wherein said thermal ballast module is disposed adjacent to said thermoelectric module.

7. (currently amended) The apparatus of claim 5, wherein said thermoelectric module in is mounted on said thermal ballast module.

8. (original) The apparatus of claim 5, wherein said thermal ballast module further comprises:

a sealed, hollow vessel constructed from a material having a high thermal conductivity; and

a plurality of internal fins configured for facilitating heat transfer from said base member to an internal ballast material, said internal ballast material including a high heat-capacity material.

9. (original) The apparatus of claim 4, further comprising a plurality of cooling ports within said base member, said cooling ports for receiving a cooling medium circulated therethrough supplied by a cooling supply line.

10. (original) The apparatus of claim 9, wherein said cooling supply line is coupled to a cooling medium connector disposed through a vacuum chamber wall of an FIB tool.

11. (original) A method for implementing focused ion beam (FIB) processing, the method comprising:

mounting a sample on a mounting surface of an FIB tool, said mounting surface including a thermoelectric element;

controlling said thermoelectric element so as to reduce the temperature of said sample with respect to an ambient FIB tool temperature; and

applying an FIB to said sample.

12. (original) The method of claim 11, wherein said thermoelectric element further comprises a Peltier device.

13. (original) The method of claim 11, further comprising utilizing said FIB to deposit a layer on said sample.

14. (original) The method of claim 13, wherein said layer comprises an insulating layer deposited using a silicon-bearing precursor.

15. (original) The method of claim 14, wherein said insulating layer comprises SiO_2.

16. (currently amended) The method of claim 13, wherein said layer comprises an insulating layer deposited using at least one or more of the following precursor combinations: tetramethylcyclotetrasiloxane (TMCTS) with no oxidizing agent, tetraethylorthosilicate (TEOS) with O_2, TMCTS with H_2O, ~~TEOS~~ TMCTS with O_2, TEOS with O_2, TEOS with H_2O.

17. (original) The method of claim 13, wherein said layer comprises a metal layer deposited using at least one or more of the following precursor combinations: tungsten hexacarbonyl ($W(CO)_6$), methylcyclopentadienyl (trimethyl) platinum (V), any of the beta-diketonate copper (II) complexes, and any of the Lewis-base copper (I) beta-diketonate complexes.

18. (original) The method of claim 11, further comprising utilizing said FIB in a removal process to remove material from said sample.

19. (original) The method of claim 18, wherein said removal process further comprises at least one of: milling silicon using a xenon difluoride (XeF_2) precursor, milling SiO_2 using an XeF_2 precursor, milling tungsten using an XeF_2 precursor, milling SiCOH type low-k dielectric materials using an XeF_2 precursor, milling chromium using an XeF_2 precursor, milling organic materials and polymers using an XeF_2 precursor, milling copper using an XeF_2 precursor, milling silicon using a Br_2 precursor, and milling aluminum using a Br_2 precursor.